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Behavioral Research in Accounting

Vol. 28, No. 2

Fall 2016

pp. 1 – 16

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American Accounting Association | Publications

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Does Self-Certification Encourage or Reduce Opportunistic Behavior?

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ABSTRACT: We experimentally investigate the effectiveness of a self-certification requirement as an informal control to reduce opportunistic behavior. We predict and find that a requirement that managers sign to take sole responsibility for their decisions—even though the decision is kept private—acts as a “double-edged sword.” Using a capital investment setting involving two decision stages, we find that self-certifying managers are less likely to behave opportunistically at the first stage. However, at the second stage, managers are more likely to behave opportunistically if they previously self-certified an opportunistic decision. Additional analysis indicates that a monitoring-based control removes the effectiveness of self-certification altogether. Overall, we find that the effectiveness of a self-certification requirement in reducing opportunistic behavior is bounded by its timing and the presence of other controls; it is potentially useful when managers are making a first decision, and only in the absence of a formal monitoring system.

Keywords: self-certification; opportunism; monitoring; informal control.

Data Availability: Data available upon request. Please contact the authors.

INTRODUCTION

Management accounting systems (MAS) provide critical information about organizational performance. If used appropriately, then this information should facilitate managerial decisions that result in the optimal use of scarce resources (Sprinkle 2003). However, agency theory suggests that managers (agents) are motivated by self-interest, and unless suitable monitoring or contracting mechanisms are in place, will choose to use or disregard such information to maximize their own welfare at the expense of the organization (principal). Drawing on this underlying assumption of *homo economicus* (i.e., individuals are rational and selfish), the focus in the management accounting literature has been to identify and develop control systems and incentive plans that make opportunistic behavior less viable (e.g., through monitoring) or to increase goal alignment via economic contracting.

However, the overall finding in the psychology and accounting literatures is that individuals' behavior is at least partially driven by internal moral values¹ (e.g., Murphy 1993; Hannan, Rankin, and Towry 2006; Rankin, Schwartz, and Young 2008; Church, Hannan, and Kuang 2012; Davidson and Stevens 2013). These values serve as constraints against opportunistic behavior, with studies indicating that people want to be moral and consider honesty to be important to their self-identity (e.g., Stevens 2002; Mazar, Amir, and Ariely 2008; Stevens and Thevaranjan 2010; Barkan, Ayal, and Ariely 2015). Further, a growing body of research suggests that opportunistic behavior may be limited by non-pecuniary factors, such as a high level of moral reasoning (Rutledge and Karim 1999) or informal organizational controls, which communicate organizational views or values, but do not involve formal enforcement (Newman 2014; Kachelmeier, Thornock, and Williamson 2015). Consequently,

The authors thank Kelsey Dworkis, Gary Hecht, Stijn Masschelein, participants at the 2011 ABO Conference, 2012 Monforma Conference, 2014 AFAANZ Conference, and seminar participants at UNSW Australia, University of Technology Sydney, and The Australian National University for their helpful comments on earlier versions of this paper. Funding from AFAANZ Research Grant Scheme is gratefully acknowledged.

Editor's note: Accepted by Kristy L. Towry.

Submitted: December 2014
Accepted: April 2016
Published Online: April 2016

¹ Similar to prior literature, we use the term moral values to broadly refer to an agent's willingness to engage in opportunistic behavior, such as shirking or being dishonest when preparing budgets. For example, Stevens and Thevaranjan (2010) use the term “moral sensitivity” to describe the agent's willingness to deviate from self-interested opportunism. Mazar et al. (2008) include honesty as part of an individual's morality.

there have been calls for further research into how informal controls and moral values can be explicitly built into MAS design, and how agency theory can be expanded to take into account agents' preferences for non-pecuniary factors under specific contexts (e.g., Sprinkle 2003; Salterio and Webb 2006; Kachelmeier et al. 2015).

Our study answers calls for further research into informal controls by experimentally investigating the effectiveness of self-certification in curbing opportunistic behavior. In our study, "self-certification" describes an informal, trust-based control mechanism whereby managers sign their names to accept responsibility for a decision, but know that there are no penalties associated with the decision because the information upon which it is based is private and not monitored.² We examine this informal control using a capital investment setting with two decision stages, where managers have the opportunity to continue an under-performing project for personal gain.

We draw on prior research that demonstrates that individuals derive satisfaction from having a positive self-identity (e.g., being an honest person) and behaving consistently with that self-identity (Mazar et al. 2008; Barkan et al. 2012), as well as research on cognitive dissonance (Festinger 1957), to predict that self-certification will act as a "double-edged sword." The effect of a self-certification requirement at a first decision stage is to reduce opportunistic behavior, but the effect at a second stage is to potentially increase it.

Specifically, we posit that when managers are aware of the requirement to self-certify responsibility for their decision, the incongruity between their internal moral values and the pursuit of opportunistic behavior is heightened. We argue that the anticipated cognitive dissonance arising from this incongruity, and the wish to avoid it, will discourage managers from making a decision that benefits them personally at the expense of the organization. However, the *ex post* effect of self-certification depends on the nature of the first decision. Once a decision is made and physically self-certified by the managers, a strong link is established between that decision and their self-identity. If managers choose to continue an unprofitable project despite self-certification, then their future actions will be affected by a desire to reduce the experienced dissonance associated with their decision. For these managers, we predict that the effect of self-certification will reverse in a subsequent decision period, resulting in an increased tendency to behave opportunistically instead of a reduced one.

We test our predictions about the boundaries of the effectiveness of a self-certification requirement in a capital investment context. Participants assume the role of a manager who must make a private decision whether to terminate or continue a clearly under-performing project in their portfolio, and self-certify that decision, at two different stages. Participants are told that information about the profitability of the project will remain private, and that they have personal incentives to continue with it, as early termination can damage both reputation and promotional opportunities. Therefore, both goal misalignment and information asymmetry, the two conditions most likely to result in opportunistic behavior, are present in our setting (Harrell and Harrison 1994). We choose this setting because the problem of continued investment in under-performing projects (often referred to as escalation of commitment) is both common and costly to organizations (e.g., Keil 1995; Kadous and Sedor 2004; Denison 2009; Sleesman, Conlon, McNamara, and Miles 2012), and prior research also indicates that a high level of moral reasoning or a strong ethical environment can mitigate a manager's tendency to do this (Rutledge and Karim 1999; Booth and Schulz 2004). This suggests that the problem can be seen as a moral dilemma in some instances, and reduced if the agent is encouraged or inclined to act ethically.

As predicted, we find that managers who self-certify their decisions are significantly less likely to continue an under-performing project in stage one, compared to those who are not required to self-certify. However, also as predicted, we find that the *ex post* effect of self-certification in stage two is to increase opportunistic behavior in some instances. Specifically, managers who continue an under-performing project in stage one are significantly more likely to continue in stage two if they have a self-certification requirement, compared to those who do not, despite being told that project performance is worsening (and after controlling for their project continuation tendency in stage one).

We also conduct a 1×2 supplementary experiment, to examine the effect of a self-certification requirement in conjunction with a monitoring mechanism (random internal audits). Prior research suggests that monitoring can increase agents' abilities to rationalize dishonest behavior (Bailey, Laird, and Fessler 2015). Our finding shows that self-certification does not reduce opportunistic decision-making when managers are told that they may be audited. In fact, we find some evidence that self-certification potentially increases managers' likelihood of continuing an under-performing project when audit is a possibility.

Our study contributes to a growing body of research investigating the extent to which informal management controls can positively affect managerial behavior and encourage managers to act in the organization's interests, even at the cost of their private economic interests (Jollineau, Vance, and Webb 2012; Newman 2014; Kachelmeier et al. 2015). Salterio and Webb

² The concept of self-certification is analogous to an "honesty system," such as where an organization allows employees to apply for sick leave without a medical certificate, or to self-certify their per diem travel expenses in the absence of receipts. In some cases, self-certification comes with a monitoring mechanism (e.g., self-certified income tax returns are subject to the possibility of audit by the tax office). In this study, we consider both scenarios—a "pure" self-certification mechanism (the main experiment), and a self-certification mechanism implemented in conjunction with monitoring (the supplementary experiment).

(2006) suggest that a presumption of individuals' basic preference for honesty can provide a rich foundation for improved control system design, and that a control system that focuses on promoting honesty is potentially more useful than one that focuses on detecting dishonest behavior. In this study, we show that a relatively simple and non-intrusive control mechanism—self-certification—can promote honesty and goal-congruent decisions in a setting that prior research has demonstrated often results in opportunistic behavior. However, there are boundary conditions to this control mechanism. We find that managers who make a signed commitment to an opportunistic decision, despite any *ex ante* anticipated dissonance from doing so, are more likely to continue to behave opportunistically in the subsequent period. This suggests that self-certification potentially encourages *ex post* self-justification tendencies. Our finding is consistent with prior psychology research that shows that the desire to maintain commitment to a previous unethical act in order to reduce dissonance can lead to even more unethical acts (e.g., Mulder and Aquino 2013).

Our research also adds to prior psychology research on cognitive dissonance and its effect on opportunistic and dishonest behavior (e.g., Barkan, Ayal, Gino, and Ariely 2012; Barkan et al. 2015). The finding that the self-certification effect is different between stages one and two suggests that the timing of a dissonance-based intervention influences its effectiveness: while the anticipation of dissonance can reduce opportunistic behavior, experienced dissonance can increase it.

The result from our supplementary experiment further highlights another boundary condition of self-certification as an informal control mechanism. We find that self-certification is not effective when combined with formal monitoring (random internal audits). This suggests that a control mechanism that appeals to managers' inherent moral tendencies is fragile, and can be overwhelmed by "traditional" control systems. A practical implication of this finding is that organizations should not simply superimpose self-certification requirements on top of existing monitoring-based controls; instead, organizations may consider combining self-certification with other "involvement-oriented controls" (i.e., control mechanisms that encourage participation and empowerment) to promote pro-organizational behavior (Davis, Schoorman, and Donaldson 1997). A second practical implication is that a self-certification requirement is only effective in specific settings in which managers are not required to make repetitive decisions about the same course of action.

The rest of this paper is structured as follows. First, we discuss the background literature and propose H1a and H1b, followed by the research method and results analysis for our main experiment. Next, we present Research Question 1 and discuss how we investigate it using a supplementary experiment. Finally, we discuss the implications of our results, their limitations, and provide suggestions for future research.

THEORY AND HYPOTHESES

Prior literature on honesty and agency theory has shown that individuals remain partially honest even in the presence of financial incentives that encourage opportunistic behavior (e.g., Chow, Cooper, and Waller 1988; Evans, Hannan, Krishnan, and Moser 2001; Hannan et al. 2006). These findings support the argument that individuals derive satisfaction from being honest, and from complying with a set of moral standards that form part of their self-identity (Mazar et al. 2008). Leippe and Eisenstadt (1999) posit that individuals need to justify their behavior to themselves, as well as others, and that a discrepancy between the individual's behavior and his or her private values leads to cognitive dissonance—the psychological discomfort that occurs when an aspect of one's behavior threatens one's self-identity (Festinger 1957).

In this study, we argue that a control intervention that more closely ties managers' self-identity to a decision will affect their willingness to behave opportunistically. We posit that the impact of a self-certification requirement will differ depending on whether the self-certification requirement is presented for a decision for the first time (H1a) or for the second time (H1b).

Impact of Self-Certification on a First Decision

We examine the effectiveness and boundary conditions of a self-certification requirement in a setting in which managers can personally benefit from continuing an under-performing project in the presence of information asymmetry.³ In our experimental setting, the self-certification requirement involves participants acting as managers and signing their initials after they have made a reinvestment decision, to certify that they have considered their investment alternatives carefully and accept full responsibility for their decision. Managers are told that their certification is filed with other project information, all of which remains private to them. Thus, the self-certification process is not accompanied by additional monitoring or a reduction in the managers' information advantage, and is, in essence, a trust-based control.

³ Continuation of an under-performing investment can also occur for reasons other than opportunism and dishonesty; for example, managers may continue a seemingly unprofitable project because of a genuine belief that the project will turn around, or because they are being influenced by sunk costs, or are experiencing accountability pressure (e.g., Garland, Sandefur, and Rogers 1990; Moser, Wolff, and Kraft 2013). In our study, we use a setting in which managers are likely to continue a project for personal gain as an example of opportunistic behavior.

A number of prior accounting studies have shown that control system features that highlight positive values important to an individual's self-identity (e.g., adhering to social norms, maintaining an honest appearance) can reduce self-interested behavior. For example, Davidson and Stevens (2013) show that managers exhibit less opportunistic behavior when they are given the option to accept (and certify) or decline a code of ethics in an investment game. The authors argue that the certification choice focuses managers' attention on the consistency between their self-identity and the relevant social norms (e.g., to act ethically and to keep one's promise). Maas and van Rinsum (2013) find that managers' concerns about their peers' perception of their honesty reduces their tendency to overstate performance. In both studies, the managers are aware that the principal or their peers will find out if they have acted fairly or honestly; this setting makes the adherence to the prevailing ethical norm particularly salient. In our study, we argue that the requirement to self-certify a reinvestment decision will affect managers' decisions even though the principal and their peers will never find out whether the reinvestment decision was made in the best interests of the organization.⁴

Although the manager's certified statement in our study is not a code of ethics such as the one examined in Davidson and Stevens (2013), nor does it invoke a new set of moral values, a signed acknowledgement of decision responsibility has the effect of establishing a closer link between a manager's self-identity, his or her decision, and its consequence (Kettle and Häubl 2011). When managers self-certify their reinvestment decision, they are explicitly and formally acknowledging to themselves that they are responsible for making that decision. Psychology research has long argued that individuals are motivated to avoid situations that may cause them to act inconsistently with their self-identity (Festinger 1957). The term "moral dissonance" or "ethical dissonance" is sometimes used to refer to the dissonance individuals experience when confronted with a situation that may lead them to act in ways that are inconsistent with their moral self-image (e.g., Lowell 2012; Barkan et al. 2012). Desirous of maintaining a consistent and positive self-image, individuals are driven to make decisions to avoid creating this dissonance, even when they do not have to justify the decision to anyone else (Festinger 1957).

In the current context, we posit that a self-certification requirement increases a manager's anticipation of dissonance arising from making an opportunistic, selfish decision when they wish to maintain a positive self-identity.⁵ To avoid experiencing this dissonance, they are less likely to continue an under-performing project for personal gain. This leads to our first hypothesis:

H1a: Managers are less likely to continue an under-performing project when they are required to self-certify their decision.

In contrast, continuing an adequately performing project does not conflict with a manager's ability to view him- or herself as an honest person, as it will also clearly benefit the organization. Thus, we expect that a self-certification requirement will have no effect on a manager's decision to continue the project in such instances. Figure 1 illustrates the decision flows that participants are exposed to in this study.

Impact of Self-Certification on a Second Decision

While we expect self-certification to decrease the likelihood of continuing an under-performing project in a first decision stage, we expect the opposite in a second decision stage. Specifically, we expect that self-certifying managers will be more likely to continue an under-performing project when making a second decision about the project, compared to those who do not self-certify.

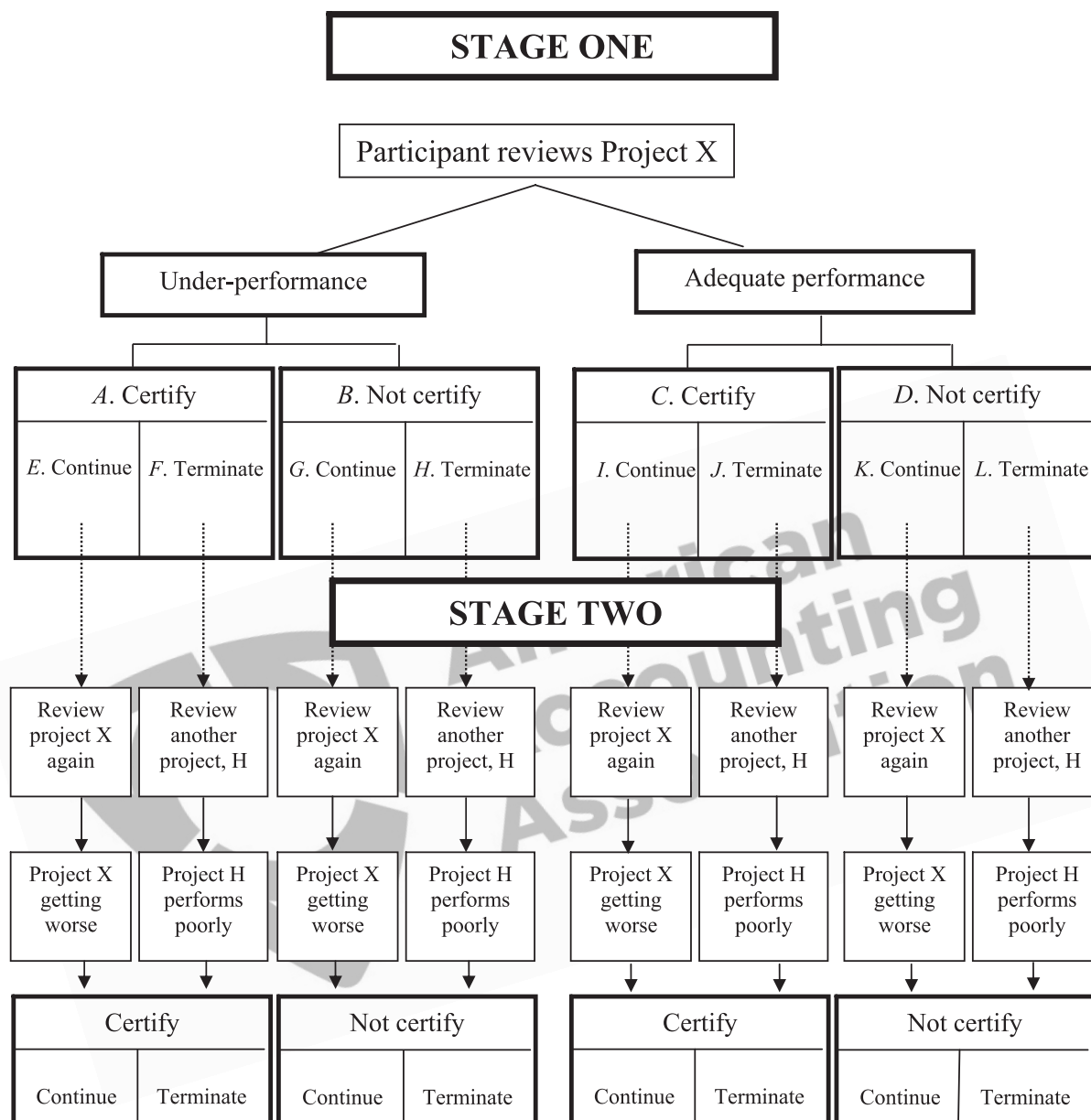
There is evidence from the psychology literature that individuals may engage in unethical or immoral behavior in order to resolve cognitive dissonance and to justify their earlier morally questionable behavior (Mulder and Aquino 2013; Martens, Kosloff, Greenberg, Landau, and Schmader 2007).⁶ We argued previously that self-certification more closely ties the managers' self-identity to the decision at hand, and heightens the cognitive incongruity of deciding to continue an under-performing project when trying to maintain a self-concept of being a moral, ethical person. We hypothesized in H1a that this

⁴ We do not have direct examples of firms using such an approach in practice; however, there is value in examining how an informal control such as this could impact behavior. Organizations do make use of informal control systems that may not ever involve enforcement. Kachelmeier et al. (2014) argue that organizations may use a range of methods to maximize productivity while maintaining accuracy, including the exertion of social pressure through communicated organizational values, even in the absence of enforceable control measures.

⁵ Our prediction relies on the assumption that individuals' self-identity includes the belief that they are moral and honest. As discussed previously, prior research in both accounting and psychology has indicated that this is a reasonable assumption (e.g., Evans et al. 2001; Mazar et al. 2008). Somanathan and Rubin's (2004) definition of honesty involves keeping an implicit commitment to the employer even at the expense of self-interest; Grover (2005) considers actions such as cheating, violating generally acceptable principles, and pretending as subsets of dishonest behavior.

⁶ For example, Martens et al. (2007) conduct a "bug extermination" experiment and show that individuals who are induced to kill bugs in a practice trial have a greater tendency to kill more bugs in subsequent trials; further, this tendency is exaggerated by the individuals' self-reported similarity to the bugs as living beings. Martens et al. (2007) argue that this effect occurs because perceived similarity with the "victims" increases individuals' psychological discomfort from killing during the practice trial, causing them to subsequently escalate their behavior in later trials in order to resolve this dissonance.

FIGURE 1
Decision Flow



Participants complete two decision stages. Cells A, B, C, and D indicate the four treatment cells associated with stage one decisions (participants receive project information representing either adequate performance or under-performance of Project X, and whether they are either required to self-certify their decision). Participants can either choose to continue Project X (Cells E, G, I, K) or terminate it (Cells F, H, J, L). As none of the participants chose to terminate a project with adequate performance in stage one, ultimately, there were no participants in cells J and L. Participants who chose to continue Project X in stage one were asked to review it again in stage two; participants who terminated Project X in stage one were asked to evaluate a new project in stage two, Project H.

will increase managers' *anticipated* dissonance, leading them to be less willing to behave opportunistically when making a first project continuation decision. However, in the event that they do still make an opportunistic first decision, the act of self-certification will lead managers to *experience* greater dissonance compared to those who continue, but do not have to self-certify. Consistent with prior literature, we expect that this experienced dissonance will result in an increased need for managers to self-justify their first decision and, therefore, continue their worsening project at a second decision stage (Staw 1976).

Further, self-certification can be seen as a symbolic act that reinforces managers' psychological commitment to their decision. Psychological commitment induces behavioral consistency (Baca-Motes, Brown, Gneezy, Keenan, and Nelson 2013) and is also found to be a strong antecedent to self-justification behavior (Kiesler 1971; Cheng, Schulz, Luckett, and Booth 2003). Therefore, we expect that self-certifying managers who choose to reinvest in an under-performing project in stage one are more likely to continue investment in the under-performing project in stage two, compared to those who continued the project without self-certification. Based on this argument, we predict the following (refer, also, to Figure 1):

H1b: Managers who continued an under-performing project in stage one and self-certified their decision are more likely to continue the project in stage two (despite worsening performance) than those who continued, but did not self-certify.

METHOD

Experimental Design

A 2 (adequate or under-performing project performance in stage one) \times 2 (self-certification present or absent) between-subjects factorial design was used to test the hypotheses. The first independent variable was project performance in stage one (i.e., performance prior to the first decision): whether a project that the participant was responsible for was performing adequately or under-performing. The second independent variable was presence or absence of self-certification: all participants were asked to tick a box to indicate that they were either continuing or terminating the project, but when self-certification was present, participants were also asked to sign their initials on a self-certification form (discussed in further detail later).

Research Task and Independent Variable Manipulation

The research task comprised two decision stages (refer to Figure 1). In stage one, participants assumed the role of a junior project manager who had to decide whether to continue a project in his or her portfolio or terminate it and invest in an alternative project. They were told that they had started "Project X" three years ago and there were two years left until completion.⁷ Project X was their sole responsibility, and as a junior project manager, developing a reputation for always completing projects successfully was very important to their career. Further, they had extensively promoted Project X to their peers and to the CEO. Participants were also informed that they were the only people with access to the project information. Thus, both an incentive to shirk and information asymmetry existed in all conditions and in both decision stages.

To manipulate project performance, participants were told either that project X was performing adequately ("adequate performance" treatment) or under-performing ("under-performance" treatment). In the "adequate performance" treatment, participants were told that the net cash flows of the project were as expected. Further, the project had an expected internal rate of return (IRR) that exceeded the participant's current portfolio return, as well as the organization's recommended minimum IRR and the IRR of an alternative investment opportunity. In contrast, in the "under-performance" treatment, the net cash flows of the project had been declining. In addition, the project had an expected IRR that was lower than the participant's current portfolio return, the firm's recommended minimum IRR, and the IRR of the alternative investment opportunity. Thus, at this stage of the experiment, it was very clear to participants that while project continuation would benefit them personally, the economically correct decision to maximize firm value in the "under-performance" treatment was to terminate the project, and to continue the project in the "adequate performance" treatment.

To manipulate self-certification, participants in the "certification present" treatment were told that they would have to sign a statement indicating that they were taking full responsibility for their decision once it was made. They were also told that this statement would not be reviewed by others and would be filed away with other documentation about the project. Although participants were made aware of the self-certification requirement in advance of their decision, they did not view the actual certification form until after they had indicated their first decision to continue or terminate the investment.

After reading through the information provided, all participants were asked to indicate on a six-point Likert scale whether they would continue Project X (where 1 = definitely terminate and 6 = definitely continue). Once participants had made their decision, they were asked to either tick a box confirming their decision to continue or terminate the project ("certification absent" treatment), or to both tick a box and complete and sign a "project certification form" ("certification present" treatment). Participants in the latter treatment read that by signing their initials, they were acknowledging that they had carefully

⁷ Prior research has found that initial decision responsibility influences managers' continuation tendency (e.g., Staw 1976). To control for this, we informed participants in all treatments that they were responsible for the initial investment decision. Further, to avoid complicating the decision and adding noise to the results, we did not provide participants with any information about the nature or strategic implications of the project.

FIGURE 2
Manipulation of “Self-Certification”

An extract from the “certification present” treatment^a

Please complete the following ABC Ltd project certification form:

ABC Ltd Project Certification Form

By signing this form, I acknowledge that I carefully considered both the expected IRR of this project, and of any alternative project(s) when making my decision.

Please tick one of the boxes below:

☐ I accept responsibility for my decision to **continue** this project

☐ I accept responsibility for my decision to **terminate** this project

Please write your initials below:

My initials here: _____

^a In the “certification absent” treatment, participants did not receive the above certification form. Instead, they were asked to tick a box to indicate either “My decision is to continue this project” or “My decision is to terminate this project.”

considered the IRR of both Project X and the alternative project in making their decision, and that they accepted responsibility for their decision to continue or terminate the project (refer to Figure 2).

In stage two, participants were given a second document (they were allowed to refer back to the initial task information, but were not allowed to change the answers they provided in stage one). They were informed that a year had passed and that a project they were managing was under-performing, with one year left until completion. Participants who had continued the under-performing project (Project X) in stage one learned that the project performance had worsened in the following year. Participants who had terminated Project X in stage one were given another project in their portfolio to review (Project H), which was also under-performing. Thus, in stage two, all participants had to decide whether to continue or terminate an under-performing project. As at stage one, all participants were asked to indicate their investment decision on a six-point Likert scale, and those in the “certification present” treatment were again asked to self-certify their decision (participants in the “certification absent” treatment were not asked to self-certify at any stage). Once stage two was completed, task materials were removed and participants were presented with a manipulation check question and demographic questions.⁸

Participants

Participants were graduate business students enrolled in an advanced management accounting course not taught by the authors. All participants had knowledge of capital investment assessment techniques through their course work. Participation was voluntary; however, each participant received a shopping gift card valued at \$15 in appreciation for their time and effort. In total, there were 103 participants.

⁸ The manipulation check question asked participants to indicate whether they were required to sign a certification form. Seven participants in the “under-performing/certification absent” treatment and nine participants in the “adequate-performing/certification absent” treatment failed this manipulation check. We reanalyzed the results after excluding participants who failed the manipulation check, and the results remained the same or became slightly more significant. Given this, and in order to increase statistical power, we have included the full sample in our analysis. We also analyzed the demographic data to confirm that there were no differences in age, gender, and work experience across treatment groups.

Dependent Variables

At both stage one and stage two, our dependent variable was participants' reinvestment decision. This was measured in two ways: (1) by the use of a six-point Likert scale (where 1 = "definitely terminate project" and 6 = "definitely continue project"); and (2) by asking participants to tick a box indicating either a decision to continue or a decision to terminate.⁹

RESULTS

Tests of Hypotheses

Figure 3 presents the descriptive statistics of participants' project continuation decisions at both stage one and stage two, with the statistics for the "under-performance" treatment and the "adequate performance" treatment presented in Panels A and B, respectively. H1a proposes that managers who are required to self-certify their decisions are less likely to continue an under-performing project, compared to managers who are not required to self-certify (Cell A versus Cell B in Figure 1). Thus, H1 focuses on the two cells (certification present versus absent) under the "under-performance" treatment. As expected, participants faced with under-performing projects were more likely to continue investment in the absence of self-certification (mean = 4.000) than when it was present (mean = 3.094); this difference is statistically significant ($t = 2.844$, $p = 0.003$, one-tailed), providing support for H1a. We also analyzed participants' dichotomous responses, that is, the proportion of participants who ticked the box "continue this project" versus those who ticked the box "terminate this project." We conducted a two-proportional z-test (Sheskin 2004) to show that the proportion of participants who chose to continue the under-performing project in stage one is significantly higher in the "certification absent" treatment than the "certification present" treatment (71.4 percent versus 46.9 percent, $z = 1.9204$, $p = 0.027$, one-tailed). This result provides additional support for H1a.

For participants in the "adequate performance" treatment, we expected (but did not hypothesize) that all participants would choose to continue the existing project in stage one, regardless of the certification treatment, as there is no agency problem and, therefore, no anticipated dissonance under this condition. Descriptive statistics are presented in Figure 3, Panel B. As expected, no participants in the "adequate performance" treatment terminated the project.¹⁰

H1b predicts that of the managers who continued an under-performing project in stage one, those who certified their reinvestment decision would be more likely to continue the under-performing project in stage two than those who did not certify their decision (Cell E versus Cell G in Figure 1). We test H1b using the subsample of participants who continued Project X (15 in the "certification present" treatment and 18 in the "certification absent" treatment). Figure 3, Panel A shows that participants who continued with the under-performing project in stage one were more likely to continue in stage two when the self-certification requirement was present (Cell E, mean = 4.667) than when it was absent (Cell G, mean = 4.111). Consistent with H1b, a simple t-test shows that this difference is marginally significant ($t = 1.383$, $p = 0.089$, one-tailed). In addition, we also conduct a one-way ANCOVA in which we include participants' continuation tendency in stage one as a covariant.¹¹ The ANCOVA model in Table 1 shows that while stage one continuation tendency was a significant covariant ($F = 8.374$, $p = 0.007$), the difference in stage two continuation tendency between participants in the "certification absent" and "certification present" treatments was still marginally significant ($F = 3.319$, $p = 0.078$). Thus, even after taking into consideration participants' continuation tendency in stage one, H1b remains supported.

Finally, we also analyzed participants' dichotomous responses. Figure 3, Panel A shows that in the "certification present" treatment, 93.3 percent of participants who continued an under-performing project in stage one also chose to continue the project in stage two, compared with 61.1 percent of participants in the "certification absent" treatment. Given the relatively small sample size in stage two, we used Fisher's exact test to compare the proportions. The difference is significant ($p = 0.038$, one-tailed). Thus, our overall results provide support for H1b.

⁹ The second measure is mainly the outcome of the research design. That is, in the "certification present" treatment, participants had to tick a box on a project certification form to accept responsibility for their decision to continue or to terminate the project. To ensure consistency, we also had participants in the "certification absent" group tick a box to indicate their reinvestment decision.

¹⁰ A 2×2 ANOVA was also conducted on the stage one decisions of participants (independent variables being whether the project was performing adequately or under-performing, and whether participants were required to self-certify their decision). The results are consistent with those from the tests reported above; we find significant results for both project performance ($F = 79.966$, $p = 0.000$) and certification ($F = 4.222$, $p = 0.043$), and also a significant interaction between those variables ($F = 5.138$, $p = 0.026$).

¹¹ This allows us to control for participants' continuation tendency in stage one. That is, by including the stage one response as a covariant, we are more confident that the result can be attributed to the certification process itself, rather than the possibility that the participants who were more likely to continue the project in stage one were also more likely to do so in stage two.

FIGURE 3
Descriptive Statistics for Main Experiment

Panel A: “Under-Performance” Treatment

	Certification – Present (Cell A in Figure 1 ^b)				Certification – Absent (Cell B)				Avg.
Decision score ^a (stage one)	3.094 (1.376) n = 32				4.000 (1.089) n = 28				3.517 (1.321) n = 60
	Continue Project X number (%) (Cell E)		Terminate Project X ^c number (%) (Cell F)		Continue Project X number (%) (Cell G)		Terminate Project X number (%) (Cell H)		
	15 (46.9%)		17 (53.1%)		20 (71.4%)		8 (28.6%)		
Decision score ^a (stage two)	4.667 (0.817) n = 15		3.400 (1.549) n = 15 ^d		4.111 (1.451) n = 18 ^d		4.000 (1.195) n = 8		
No. (%)	Continue Proj. X 14 (93.3%)	Terminate Proj. X 1 (6.9%)	Continue Proj. H 9 (60.0%)	Terminate Proj. H 6 (40.0%)	Continue Proj. X 11 (61.1%)	Terminate Proj. X 7 (38.9%)	Continue Proj. H 6 (75.0%)	Terminate Proj. H 2 (25.0%)	

Panel B: “Adequate Performance” Treatment

	Certification – Present (Cell C)				Certification – Absent (Cell D)				Avg.
Decision score ^a (stage one)	5.444 (0.5113) n = 18				5.400 (0.7071) n = 25				5.4186 (0.626) n = 43
	Continue Project X number (%)		Terminate Project X number (%)		Continue Project X number (%)		Terminate Project X number (%)		
	18 (100%)		0 (0%)		25 (100%)		0 (0%)		
Decision score ^a (stage two)	3.500 (1.689) n = 18		NA		3.600 (1.190) n = 25		NA		
No. (%)	Continue 11 (61.1%)	Terminate 7 (38.9%)	Continue NA	Terminate NA	Continue 17 (68.0%)	Terminate 8 (32.0%)	Continue NA	Terminate NA	

^a Six-point scale, where 1 = definitely terminate, 6 = definitely continue.

^b All Cell references relate to Figure 1.

^c Participants who terminated Project X in stage one were asked to review a different project, Project H, in stage two.

^d Four participants across two treatments were excluded in stage two due to missing data/incomplete responses.

Additional Analysis

We conducted additional analyses to examine the effect of self-certification on the stage two decisions of those participants whose first decision did not threaten their positive self-identity; that is, those participants who “correctly” chose to terminate an under-performing project, and those who chose to continue an adequately performing project. First, we examine those who

TABLE 1
ANCOVA Results

Source	Sum of Squares	df	Mean Square	F	p-value
Stage 1 Continuation tendency	9.844	1	9.844	8.374	0.007
Self-Certification	3.901	1	3.901	3.319	0.078
Error	35.267	30	1.176		
Total	676.000	33			

chose to terminate an under-performing project in stage one (refer to cells F and H in Figure 1). These participants were given a second under-performing project to review in stage two. Figure 3, Panel A shows that although participants who terminated the project in stage one had a higher average decision score in stage two under the “certification absent” treatment than the “certification present” treatment (4.000 versus 3.400), this difference is not statistically significant ($F = 0.256$, $p = 0.619$). Therefore, we find no evidence that the self-certification process influences participants’ stage two decision in relation to another under-performing project. However, this insignificant finding may be the result of a combination of a reduced sample size and participants’ reluctance to terminate two projects consecutively.

Next, we examine the stage two decisions of participants in the “adequate performance” treatment. For these participants, stage two is the first time they receive negative feedback about their project and, thus, the first time they are faced with an opportunity to advance their self-interest at the expense of the principal. We did not make a prediction about the stage two decision as it was possible that anticipated dissonance associated with self-certification would reduce opportunistic behavior (similar to the logic underpinning H1a for under-performing projects in stage one); however, having already self-certified continuance of the project once, participants’ psychological commitment to the project may be heightened. Further, at stage two, the project was also closer to completion, which would lead to a stronger desire to continue (Garland and Conlon 1998; He and Mittal 2007). Our results indicate that there are no significant differences in the decisions of those who had to certify and those who did not (either on the Likert scale or the dichotomous scale). This suggests that a self-certification requirement did not affect the stage two decisions of those who would not have anticipated or experienced dissonance regarding their first decision.

Summary

In summary, we find that managers are significantly less likely to continue an under-performing project if they are asked to self-certify their decision for the first time in stage one, supporting H1a. However, the effect of a self-certification requirement subsequently reverses in stage two. Managers who choose to continue an under-performing project in stage one are significantly *more* likely to continue that project in stage two if they have a self-certification requirement than if they do not. Additional analyses further indicate that when self-certifying managers make a first-stage decision consistent with the organization’s interests, second-stage decisions about an under-performing project are not affected by a self-certification requirement.

SUPPLEMENTARY EXPERIMENT

The Effect of Self-Certification when Random Internal Audit is a Possibility

A key characteristic of the self-certification requirement examined in the main experiment is that information asymmetry between the manager and the organization (principal) is unaffected, that is, the self-certification form and all project information is only available to the manager. The principal simply trusts managers to act in its best interests. Despite this, we find that a self-certification requirement still significantly affects managers’ decisions.

In practice, however, organizations can also choose to combine trust-based controls with formal, monitoring-based controls such as random internal audits. Any managerial decisions that have maximized self-interest at the organization’s expense may become apparent, thereby negatively impacting the managers’ reputation and career prospects. This possibility is likely to reduce the attractiveness of continuing an under-performing project and, therefore, a manager’s tendency to behave opportunistically (Harrell and Harrison 1994).

While both trust-based controls (such as the self-certification requirement in the main experiment) and monitoring-based controls (such as random internal audits) are predicted to individually reduce opportunistic behavior, it is not clear that the combined effect will be additive when both are present. The random internal audit environment makes the principal-agent context more salient by indicating that self-interested behavior is expected (i.e., the organization only implements random monitoring because of its concerns about managers’ behavior). Prior literature has demonstrated that an individual’s self-concept is multi-faceted (Deaux 1993; McConnell 2013); a small change in decision context can evoke a different decision frame and different aspects of an individual’s identity, which, in turn, induces different behavioral responses (e.g., Messick 1999; Tenbrunsel and Messick 1999; Rankin et al. 2008; Kettle and Häubl 2011). For example, gender identity is more likely to be evoked during a discussion about gender discrimination than during a discussion about investment opportunities (Messick 1999). Furthermore, individuals tend to “consult” the most salient aspects of their self-identity before making decisions (LeBoeuf, Shafir, and Bayuk 2010). In the current context, it is possible that the internal audit environment will cause managers to identify more strongly with their role as an agent with goals that are driven by self-interest.

Consistent with our argument in the main experiment, we expect self-certification to strengthen the tie between managers’ decisions and their self-identity—but this time, the presence of internal audit may make their identity as an agent with the

opportunity to pursue personal gains more salient. Managers' sense of moral responsibility for the investment decision may be reduced in an internal audit environment, because the presence of random internal audits puts the onus on the organization to discover and enforce correct actions, rather than purely relying on the manager to do the right thing (Tenbrunsel and Messick 1999). Thus, the overall impact of a self-certification requirement and internal audits may be to increase managers' awareness of their identity as self-interested agents with an opportunity to "game" the system, and diminish the anticipated dissonance usually associated with the pursuit of opportunistic behavior. The combined effect may be an increase in managers' tendency to continue an investment for personal gain.

Alternatively, both the self-certification requirement and the presence of internal audits may work together to reduce managers' opportunistic behavior. The possibility of an "inappropriate" self-certified decision being discovered may add to the effectiveness of self-certification. Based on the above arguments, we develop Research Question 1 to investigate whether self-certification will decrease managers' opportunistic behavior in an internal audit environment:

RQ1: Are managers more or less likely to continue an under-performing investment when they are required to self-certify their decisions in the presence of random internal audits?

Design, Procedures, and Participants of Supplementary Experiment

A 1×2 design was used (self-certification absent versus present) to examine RQ1. The experimental materials and design were essentially the same as for the main experiment, except that all participants reviewed an under-performing project, and all participants were told that their firm conducts random internal audits of projects. Specifically, all participants were told that there was a one-in-20 chance that their project would be reviewed by an internal auditor. If their project was selected, then the internal auditor would review all relevant information about the project and provide a report to the participant's superior.

To create the random internal audit environment, each participant was asked to randomly pick one of 20 sealed and unmarked envelopes out of a box after they made their reinvestment decision (if they were in the "certification present" treatment, this was also after self-certification).¹² The participant then individually opened the envelope to find a memo indicating whether their project would be audited.¹³ The same "random internal audit" procedures applied to both stage one and stage two decisions (participants were told that chances of being audited were independent across the two stages). In addition, we included a question in the post-experiment questionnaire to capture participants' risk-seeking preferences (modified from Kahneman and Tversky [1979] and Webb [2002]).¹⁴ Forty-nine graduate business students participated in the experiment. All participants were enrolled in the same course as the participants in the main experiment.

Supplementary Experiment Results

Figure 4 shows that the stage one mean decision score for project continuation was higher when self-certification was present than when it was absent (3.640 versus 3.208); however, this difference is not statistically significant. Figure 4 also shows that a larger proportion of participants chose to continue the under-performing project when certification was present compared to when certification was absent (60.0 percent versus 37.5 percent). A two-proportion z-test shows that this difference is not significant ($z = 1.575$, $p = 0.114$, two-tailed); thus, our results suggest that a self-certification requirement is not effective in reducing managers' opportunistic behavior in the presence of random internal audits.

In addition, we also compare the results of this supplementary experiment with the results for the "under-performance" treatment in the main experiment.¹⁵ The settings in both experiments are consistent except for the potential for random internal audit in the second experiment. A 2×2 ANOVA analysis (with the two independent variables being random internal audit present/absent, and self-certification present/absent) shows a significant interaction effect ($F = 6.373$, $p = 0.013$, see Table 2,

¹² Consistent with prior literature, we adopted a 1-in-20 chance in our random internal audit setting because a weakly effective monitoring system is more likely to result in the decision scenario being viewed as economic rather than ethical in nature, but without being so powerful as to completely deter any opportunistic behavior (Tenbrunsel and Messick 1999).

¹³ One in every 20 envelopes contained a memo stating that "Your project *has* been randomly selected for internal audit. It is estimated that the audit will be carried out at the end of next year"; the other 19 envelopes contained a memo stating that "Your project *has not* been randomly selected for internal audit." Each participant opened the envelope in the presence of the researcher, and had to acknowledge the contents of the memo by ticking a box to indicate whether their project was selected for audit.

¹⁴ We measured participants' risk preferences because risk preferences may affect participants' interpretation of the one-in-20 chance of being audited. We found no significant differences in the risk preferences of participants allocated to the "certification present" treatment and those to the "certification absent" treatment. In addition, we also reanalyzed the results for both decision stages using risk preference as a covariate; the results were unchanged.

¹⁵ We recognize the limitations of comparing the results of two independent experiments; thus, the results reported in this section need to be interpreted with caution.

FIGURE 4
Descriptive Statistics for Additional Experiment
“Under-Performance” and “Random Internal Audit” Treatment

	Certification – Present (Cell A in Figure 1 ^b)				Certification – Absent (Cell B)				Avg.
Decision score ^a (stage one)	3.640 (1.469) n = 25				3.208 (1.600) n = 24				3.429 (1.514) n = 49
	Continue Project X number (%) (Cell E)		Terminate Project X ^c number (%) (Cell F)		Continue Project X number (%) (Cell G)		Terminate Project X number (%) (Cell H)		
	15 (60.0%)		10 (40.0%)		9 (37.5%)		15 (62.5%)		
Decision score ^a (stage two)	3.733 (1.438) n = 15		3.500 (1.354) n = 10		3.889 (1.364) n = 9		3.400 (1.594) n = 15		
No. (%)	Continue Proj. X 7 (46.7%)	Terminate Proj. X 8 (53.3%)	Continue Proj. H 4 (40.0%)	Terminate Proj. H 6 (60.0%)	Continue Proj. X 6 (66.7%)	Terminate Proj. X 3 (33.3%)	Continue Proj. H 7 (46.7%)	Terminate Proj. H 8 (53.3%)	

^a Six-point scale, where 1 = definitely terminate, 6 = definitely continue.

^b All Cell references relate to Figure 1.

^c Participants who terminated Project X in stage one were asked to review a different project, Project H, in stage two.

Panel A) and no main effects. Follow-up t-tests show that when self-certification was absent, participants were significantly less likely to continue an under-performing project when the possibility of a random internal audit was present than when it was absent (3.208 versus 4.000, see Table 2, Panel B; $t = 2.146$, $p = 0.037$, two-tailed). In contrast, in the presence of a self-certification requirement, participants were marginally more likely to continue when random internal audits were possible (3.640 versus 3.094, see Table 2 Panel B; $t = 1.766$, $p = 0.084$, two-tailed). This provides some evidence that while both self-certification and random internal audits individually help lower managers' opportunistic behavior, a combination of these two control mechanisms can potentially have the opposite effect.

We also examine participants' stage two decisions when there is a possibility of internal audit (refer to Figure 4). Participants who continued an under-performing project in stage one exhibited a similar tendency in stage two, and self-certification did not make a difference (3.733 versus 3.889 for certification present and absent, respectively; $t = 0.261$, $p = 0.796$). Likewise, participants who terminated the under-performing project in stage one did not exhibit a significant difference in project continuation tendency in the “certification present” treatment and the “certification absent” treatment (3.500 versus 3.400; $t = 0.163$, $p = 0.872$).¹⁶ Thus, overall, our results show that stage two decisions are not affected by self-certification when the possibility of random internal audit is present.

CONCLUSION AND DISCUSSION

The primary aim of our study was to examine the effectiveness of a self-certification requirement in reducing managers' opportunistic behavior in a capital reinvestment decision setting. This aim was motivated by prior research showing that people have a preference for maintaining a positive self-identity by adhering to their internal moral values, of which honesty is a central component. Thus, a trust-based control mechanism that highlights the link between an individual's self-identity and the decision at hand, such as a self-certification requirement, has the potential to serve as a largely costless way to reduce opportunistic behavior.

Drawing on cognitive dissonance theory, we argued that a self-certification requirement reduces opportunistic behavior because it requires managers to formally acknowledge responsibility for their decision, thereby tying their self-identity more closely to the decision. This, in turn, heightens managers' *anticipated* cognitive dissonance from making a decision that benefits them personally at the expense of the organization, but is at odds with their internal moral values. In order to avoid actually experiencing cognitive dissonance, managers choose not to behave opportunistically. Our results supported this—we found that managers were less likely to reinvest in under-performing projects when they were required to self-certify that they were taking responsibility for their decision. However, a reliance on individuals' preference for maintaining internal

¹⁶ Similar to the findings from the main experiment, participants were more likely to continue in stage two than in stage one. A $2 \times (2)$ ANOVA with stage one versus stage two as a within-subjects design shows that while the increase in continuation tendency from stage one to stage two is significant ($p = 0.03$), there is no significant interaction effect between the certification and decision stages ($p = 0.778$).

TABLE 2
ANOVA Results for Supplementary Experiment

Panel A: ANOVA Results—Dependent Variable: Decision Score

Source	Sum of Squares	df	Mean Square	F	p-value
Corrected Model	14.756	3	4.919	2.603	0.056
Intercept	1307.814	1	1307.814	692.010	0.000
Self-certification	1.515	1	1.515	0.802	0.373
Audit	0.405	1	0.405	0.214	0.644
Interaction	12.043	1	12.043	6.373	0.013
Error	198.467	105	1.890		

Panel B: Cell Means (Standard Deviations) and Cell Sizes

Random Internal Audit	Self-Certification		
	Present	Absent	Overall
Present	3.640 (0.147) n = 25	3.208 (1.560) n = 24	3.428 (1.514) n = 49
Absent	3.094 (1.376) n = 32	4.000 (1.089) n = 28	3.520 (1.321) n = 60
Overall	3.333 (1.431) n = 57	3.634 (1.372) n = 52	3.477 (1.405) n = 109

consistency and “doing the right thing” has its limitations, as individuals are also motivated to reduce *experienced* dissonance. We found that managers who continued an under-performing investment in stage one despite the self-certification requirement were significantly *more* likely to continue in stage two, compared to those who continued the investment, but did not self-certify. Finally, our supplementary experiment indicates another boundary condition for a self-certification mechanism. We find that self-certification does not reduce managers’ opportunistic behavior when a formal monitoring-based control is in place. Instead, there is some evidence that managers are more likely to continue an under-performing investment when they are required to self-certify their decisions in the presence of formal monitoring. Overall, our study contributes to the literature by showing that appealing to individuals’ internal moral values to curb opportunism has both benefits and limitations.

There are a number of implications arising from the results of our study. Our study shows that a self-certification requirement can reduce opportunistic behavior where there is only one decision stage and no possibility of random audit (or a persistence of information asymmetry). In such a setting, making an individual’s preference for maintaining a positive self-image more salient may be an effective and relatively costless control. However, for those managers who override their aversion to anticipated dissonance and behave opportunistically, the *ex post* effect of a self-certification requirement can be to increase opportunism in the next period. Our results, thus, suggest that the effect of cognitive dissonance on managerial decisions is complex, and depends on whether managers are motivated to avoid anticipated dissonance or to reduce experienced dissonance. Although there are benefits in designing management control systems to encourage individuals to be more mindful of their internal values, such a design may also have unintended effects, such as increased commitment to prior opportunistic behavior. From a practical perspective, our findings suggest that an informal self-certification requirement is most useful for decisions that do not have multiple decision points, as it has the potential to backfire in a setting in which managers make repeated decisions about the same course of action. It would be beneficial to further investigate the effects of self-certification and other formal or informal controls on decision behavior over multiple time periods, especially in situations where there are information asymmetries and limited monitoring.

Our supplementary finding that the presence of random internal audits leads to self-certification being ineffective at reducing opportunistic behavior—and, in fact, may increase it—is consistent with prior literature that finds that the presence of a weak monitoring system can result in more selfish behavior compared to when no monitoring is present (Tenbrunsel and

Messick 1999). Similarly, Tayler and Bloomfield (2011) show that formal control activates “self-interest” personal norms. In our study, self-certification places the onus of doing the right thing on the managers, whereas random internal audits could be seen by managers as placing the onus of detection on the organization. Results from our supplementary experiment provide some evidence that combining a self-certification system with random monitoring can make managers’ self-interest more salient and can potentially worsen tendencies to behave opportunistically.

Our study has a number of limitations. First, the task was a simplistic portrayal of a real decision-making environment. Other project-related considerations, such as the strategic implications of terminating a project or the effect of early termination on other stakeholders, may also influence managers’ reinvestment decisions. Second, because stage one and stage two decisions are clearly related, the subsample of participants we use to test H1b is not fully randomized. More specifically, we test H1b by comparing participants who chose to continue a project under a self-certification system against participants who chose to continue a project in the absence of self-certification, and we cannot rule out the possibility of other individual characteristics differing between these two subgroups of participants.

Our study also gives rise to a number of future research avenues. While participants in our study were informed that they started the investment project under review, they did not actually make the initial investment choice. Prior literature has suggested that a free choice setting potentially increases managers’ perceptions of their responsibility. Future research could explore decision settings in which initial decision responsibility levels are varied with self-certification. Our study also provides some evidence that a monitoring-based control reduces the effectiveness of self-certification. However, we focus only on a weak form of monitoring control. Future studies can examine whether control strength or other types of control, such as social control and peer monitoring, can promote the effectiveness of self-certification.

In summary, we provide evidence that management control systems can leverage individuals’ inherent preferences for doing the right thing in order to achieve goal congruence within organizations. Self-certification is a potentially effective control mechanism to curb opportunistic behavior, but only in limited circumstances.

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